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JUDGMENTAL PERFORMANCE OF THE BLIND AS AFFECTED BY SOCIAL AND PHYSICAL STIMULUS CONDITIONS

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JUDGMENTAL PERFORMANCE OF THE BLIND AS AFFECTED BY SOCIAL AND PHYSICAL STIMULUS CONDITIONS

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JUDGMENTAL PERFORMANCE OF THE BLIND AS AFFECTED BY SOCIAL AND PHYSICAL STIMULUS CONDITIONS

CHAPTER I

INTRODUCTION

The purpose of this study is to investigate the relationships between judgmental performances of the blind and their tendency to become challenged by physical stimulus situations which are perceived as more or less unpredictable on the one hand and social factors in the stimulus situation on the other.

From autobiographical accounts by the blind were gained valuable leads which held promise of fruitful experimentation demonstrating the general applicability of certain basic psychological principles to the problems of the blind. From one account to another the blind writers were found to refer consistently to certain basic difficulties, the crucial importance of which was confirmed through personal observations and interviews with other blind people. The blind referred primarily to two sources of difficulty: first, maintaining spatial orientation; and, second, establishing and maintaining stable interpersonal relationships.

With blindness comes a radical constriction in the amount of reliable information about the physical environment in which the blind must function. The net result of this constriction is that the blind must maintain their notions of distance and direction by means of contact with familiar landmarks. Paralleling this is a similar constriction in the scope of their social contacts. When the number and variety of social contacts are reduced, there may be a resultant intensification of the blind's need for and reliance upon those that remain.

As might be expected, the uncertainty of these physical and social conditions for the blind have important psychological effects which are often revealed through increased fluctuations in perceptual, judgmental, and other psychological activities. The effect of stimulus conditions, both social and physical, upon the psychological functioning of the blind is the major question to be answered by this experiment.

Background

Any changes in physical space conditions that contribute to uncertainty or unpredictability are likely to result in an increase in the personal challenge to the blind. Challenge is a special case of ego-involvement. The blind are challenged by the most prosaic of situations, such as wind, rain, or snow, which mask familiar characteristics of the environment, and they are apt to display wide variations in their evaluation of conditions, as revealed through their efforts to resolve their difficulty. Barry, a blind author, reveals something of the dread experienced by the blind when confronted by conditions that would obscure or obviate the familiar characteristics of physical space conditions, "Winter was coming and that meant snow, snow that hid curbstones, that muffled sounds and equalized all terrain" (2, p. 145).

The instability of anchorages upon which the blind must depend frequently results in their becoming confused in their ideas of direction, and this is particularly true when physical space conditions are relatively new or strange. Ohnstad, also blind, illustrates the point, "We turned in another direction. 'The wind was coming from the east when we started out,' Bob said, 'Which way is east?'" (10, p. 102).

The blind, by virtue of their limited access to stable anchorages, often must rely upon their body as the major reference point in maintaining their spatial orientation. Ohnstad's remarks illustrate the extent to which confusion as to direction may result when the blind suddenly discover that they have inadvertently changed their position relative to the objects about them:

> When I stopped to get my bearings, I was completely befuddled. If north was south to me and south was north, no amount of explanation could straighten it out until I had gone over the route making note of each corner and turn (10, p. 100).

Spatial orientation for the blind is, at best, a tenuous affair, requiring constant attention to the surroundings. Confusion and disorganization are apt to result at any time; and the blind must frequently be patient until they can discover some familiar landmark or sound that will enable them to re-establish their position relative to the objects around them. Ohnstad's remarks are illustrative:

> If I lost all sense of direction somewhere on a lawn, I did not walk back and forth in circles until I tumbled into a ditch. I listened for sounds, voices, motors, that I might identify as coming from some certain building or street (10, pp. 51-52).

The extent to which spatial orientation is of serious consequence in the daily living of the blind is revealed in Barry's account of the effects uncertainty and confusion had upon him:

> Little by little my self-confidence had been seeping out of me at Old Farms. It had begun the day I hit my head on the tree, and since then the embarrassment of walking into the wrong classroom, the ever present puzzle of where I was, the uncertainty of everything I did, had slowly drained more of it away (2, pp. 165-166).

From Barry's account it is readily apparent that anything that works against the achievement and maintenance of spatial orientation may be expected to produce significant psychological effects, which are often revealed in wide behavioral fluctuations. Perceptual and judgmental activities often reflect the instability of external conditions. The consequent confusion and uncertainty are far from pleasant, and persons caught in such conditions strive actively to discover new or meaningful anchorages whereby they may bring meaning and structure to the situations.

The foregoing evidence is illustrative of the extent to which the blind must function in terms of physical space conditions that are minimal in terms of the number of stable landmarks. The blind tend to rely more heavily upon their body as a reference point for the maintenance of their ideas of direction.

Direction is but one aspect of the problem, for to function adequately in their physical environment the blind must also gain some notion of relative distances. The blind cannot know of terrain characteristics or of the existence of objects in their path until they have contacted them. Knowledge of interrelatedness of objects is gained by the blind slowly and only after considerable experience. Ohnstad tells how he structured his environment by using familiar landmarks and their relationship to each other:

> I reinforced my direction and blocks by recording landmarks along the way. A gasoline station was on the corner where I turned north; at the opposite end of the block a large mailbox flanked the walk; two blocks further north a cement mixer chugged away at some construction job. Sometimes even the sweet odor of an apple tree in bloom, or the chattering of sparrows on an ivy covered building, helped me to remember my location (10, pp. 65-66).

When the blind succeed in structuring their environment in this way, they do so by means of rather accurate ideas of distance and direction.

The way in which the blind maintain notions of relative distances is of major importance to spatial orientation. As previously noted, any alteration in the physical space conditions of the blind may result in their becoming confused and disorganized; and, as a consequence, wide variation in their perception and judgment in various dimensions (particularly distance and time) may ensue. Ohnstad reveals the way in which judgments of distance can be distorted by challenging situations, "The street was the busiest spot I had ever found in my life. The distance to the opposite curb seemed interminable" (10, p. 299). It seems likely that the blind in their determinations of relative distances rely upon internalized standards, based on units of body functioning such as number of steps, rate of breathing, etc. The same units of body functioning may well be used for judging temporal intervals. Implicit in Barry's remark is the idea of the amount of distance he had to traverse to reach the ramp, "I got to where I thought the ramp should be, and it wasn't there. I was lost again" (2, p. 93).

Normally the blind display reasonably adequate ideas of when they should reach a given landmark, as Barry revealed in his anticipation of the ramp. When he did not encounter the ramp where he expected it to be, he immediately concluded that he was lost.

Notions of time and distance are intimately related in the experience of the blind. Fox, another blind writer, points out the extent to which time can be used as an aid in maintaining orientation in physical space:

> I find my Braille watch, which enables me to tell time, to be a great aid in locating places. For example I know that ten minutes' brisk walk from my front door down the road that leads into our place will bring me to the vicinity of a gate through which I can turn to go to a neighbor's house (7, pp. 200-201).

Villey found the blind person's notions of time and space so interwoven that he concluded, "In reality, it is time, which, for the man born blind, serves as space" (15, p. 197). He maintains that "Remoteness and proximity only mean to him the time, more or less long, and the number, more or less, of intermediaries which he needs for passing from one tactile impression to another" (15, p. 197).

If Villey's conclusion is correct, it is to be expected that the blind, when challenged, will reveal significant fluctuations in their temporal judgments; and, as a consequence, their notions of time and distance will thereby be altered. Barry reveals this in regard to experience of elapsed time. "When we filed in, the place became so quiet that the only sound was the shifting of our feet. The awful quiet lasted forever" (2, p. 145), and "The short bus ride home seemed to last forever" (2, p. 124). From Monroe Fox is this account, "Even though the day was filled with activity, it seemed a million years long. I thought it would never pass . . . . It was much worse than being a child waiting for Christmas" (7, p. 104).

The blind are not exceptional in their tendency to misjudge time intervals under conditions of stress. The following account from a study by Sherif _et al_. illustrates the effect near-victory and near-defeat exercised on the time judgments of two groups of boys:

> Later in the evening, at their own cabins, both groups talked about the event. Most of the Eagles seemed to feel that the time had literally flown by, one of them saying "That was the shortest ten minutes of my life" (referring to the last 15 minutes of the contest). However, remarks at the Rattler cabin revealed that they felt the event had lasted a "Helluva long time" (12, p. 108).

The dimension of time assumes a significantly greater importance in the life of the blind simply because they, being without visual anchorages, tend to rely on it more heavily in the maintenance of their physical and social orientation.

The Stability of Social Relationships

The problem of spatial orientation for the blind has important consequences at the interpersonal level. The blind are keenly aware of the limitations of their handicap, and they tend to avoid being perceived and reacted to as being different. Ohnstad's remark is illustrative and may be taken as typical, "I did not want to be stared at and looked upon as helpless and different from others" (10, p. 45). Chevigny's remark is similarly indicative, "My inmost dislike has always been for seeming different from the rest of my fellow men" (4, p. 387).

This desire not to be different often results in the blind carefully avoiding situations that would reveal the limitations imposed by their handicap. The instability of anchorages in their physical space conditions, however, often results in their becoming confused and disorganized, even in familiar surroundings. The extent to which the blind dread being perceived and reacted to as helpless is indicated by Barry, "I could hear voices nearby, but I was darned if I was going to admit to anyone after all this time that I didn't know where I was" (2, p. 202).

From Barry's comment it is obvious that spatial orientation is a problem of ego importance to the blind, for back of his refusal to seek help is the fear of admitting to anyone that he is lost. Ohnstad reveals much the same thing in his attempt to disguise his confusion, "When I didn't know where I was, I pretended I had stopped to examine some object in my pocket or to tie my shoe" (10, p. 43).

Interpersonal relationships, as determinants of the behavior of the blind, may be as important as are physical space conditions. Lack of vision introduces a greater degree of uncertainty into the relations of the blind to others, and, for that reason, it is to be expected that the effects of positive and negative interpersonal relationships will tend to be magnified. The extent to which negative interpersonal relationships may be disruptive of orientation, both social and physical, is implicit in the blinds' fear of, and attempts to avoid, negative reactions of others. The stabilizing effects of positive interpersonal relationships on the behavior of the blind are revealed in their striving to achieve and maintain secure social ties. Ohnstad's autobiography contains an account that illustrates the point nicely:

> The summer session for the adult blind had just opened, and old and new students were strolling about the campus getting acquainted. After a few moments of chatter, four men decided to walk downtown. It is a custom that those who have some vision act as guides to those who have none at all. Only rarely do the men who have lost their sight in later years have confidence enough in themselves to walk off the campus alone.
>
> The way was long and difficult--to left and right up hill and down. They crossed streets, climbed the winding stair to the top of the viaduct, dodged through the heavy traffic of the highway, and soon found themselves walking about the main thoroughfare of the city. At length they stopped on a busy corner and waited for the sighted man in the group to lead them across. No one started. They turned to each other impatiently. No one moved. Finally one of them said: "Well, let's get going. Which one of you fellows can see?" "Not me. Can you?" "Nope. Not me." "Me neither." "Then who can see?" Silence. There they were, four blind men walking about the busiest section of the city, each thinking that some other could see. They rode back in a taxi (10, pp. 49-50).

From the foregoing observations, taken from blind writers, it becomes obvious that any device or technique that tends to facilitate spatial orientation will be resorted to by them. Confusion and uncertainty are painful, and it is understandable that the blind should become challenged by conditions that work against the achievement and maintenance of spatial orientation. The blind also need and desire stable interpersonal relationships, and the ability to travel with freedom and ease may often depend upon the stability of social as well as physical anchorages.

Experimental Evidence Relating to the Dimension of Time

Experimental work dating back to Vierordt and Mach during the 1860's shows that estimates of time are subject to variations through manipulation of stimulus conditions (3, pp. 577-582). Similarly, Gulliksen (8) found consistent differences in estimates of filled and empty time. In Woodrow's (18) survey of the experimental literature on judgment of time, there are indications that such factors as degree of interest in the task, conceptual and kinesthetic factors, characteristics of the stimulus field, and events occurring during the time interval may influence the perception of duration of time intervals. In his 1930 experiment, Woodrow (17) found that while there was fairly consistent over or under estimation by a given subject, there was wide variation between subjects in the direction of estimates.

Israeli (9) introduced various time intervals contiguously with an interval which was to be reproduced. Although subjects were not instructed to use the introduced interval as a standard in their judgments, his results show the anchoring effects of the introduced intervals. In addition, one of Israeli's conclusions supports the assumption that his subjects evolved personal standards in terms of which the objective time intervals were judged. Israeli states, "The illusions tend to persist with increased practice" (9, p. 46), thus indicating the probable establishment of subjective temporal standards.

In the foregoing presentation of findings from the field of experimental psychology, it is apparent that the dimension of time judgments may fluctuate radically as a consequence of the influence of internal and external factors. If the dimension of time comes to assume crucial importance in a person's activities, however, he will make every attempt to stabilize his behavior by discovering reliable temporal anchorages. In the absence of external landmarks he will be forced to rely upon internalized standards and may attempt to anchor these standards in terms of bodily activities such as breathing, pace counting, and the like.

All human experience tends to become organized; and, once organized, this experience constitutes a standard in terms of which further stimulus conditions will be perceived and reacted to. The more highly structured is the external stimulus field, the less will be the influence of internal standards in determining behavior. In situations where stimulus conditions are poorly structured or ill-defined, internal standards are likely to exercise a dominant influence in determining the way in which situations will be perceived and reacted to.

When conditions are such as to maximize the influence of internal factors in the determination of behavior (as is often the case with the blind) persons are most likely to be influenced markedly by others. In other words, suggestibility is not to be understood as a personality trait, but rather as a product of the stimulus conditions in terms of which the person must function. The conditions under which suggestions are likely to be accepted are aptly described by Sherif and Harvey:

> The individual, in a situation having few or no anchorages to guide him, caught in the throes of anxiety, tries to establish some level of stability. He seeks to find some standard and is susceptible to accepting a standard from another source (11, p. 276).

Thrasher's (14) research offers additional evidence in support of the foregoing remarks.

Another development which has been helpful in formulating this problem and hypothesis is a series of experiments dealing with the differential effects of alone and togetherness situations on performance. F. H. Allport's (1) early studies and evidence presented by Dashiell (6) indicate that even togetherness situations (the mere presence of other persons) produce differential effects on performance. Allport, in accounting for differences in behavior when in togetherness situations, explained, "merely being in the presence of others working upon the same problem places us in an attitude toward the task which is different from our approach to it in solitude" (1, p. 274).

When the situation is of motivational significance to the person, he is likely to become challenged (ego-involved) in his attempt to resolve the difficulties implicit in it. The degree and duration of challenge will be a function of the degree of importance ascribed to the situation and the amount of time required to resolve doubt and uncertainty stemming from the demands inherent in the situation. Such situations constitute a challenge for the individual because they lack meaningful, or stable, anchorages. Sherif and Harvey's remarks may be taken as being generally descriptive of the individual's reaction to such situations, "The individual tossing in such a state of anxiety or insecurity flounders all over in his craze to establish for himself some stable anchorages. The fluctuations of his experience and behavior are greatly increased" (11, p. 280).

The resolution of doubt and uncertainty depends upon the person's ability to discover meaningful, or reliable, social and physical anchorages, in terms of which his behavior can be rendered appropriate to the demands of the situation.

Problem and Hypotheses

Before formulating the specific hypotheses for this experiment extensive exploratory pretesting was carried out. This pretesting was done both at Oklahoma University and at the Muskogee School for the Blind to discover a judgmental dimension sensitive enough to reflect varying degrees of challenge and yet not readily susceptible to reliable anchorages. The judgmental dimension initially selected was that of distance. Using Villey's (15) observation as a lead, an attempt was made to influence the subject's judgments of distance by controlling terrain difficulty. It was assumed that the subjects would base their judgments of relative distances upon the amount of time required to traverse them with the result that the terrain requiring the greatest amount of walking time would be judged as being the longer. The pretest subjects became so challenged that they resorted to pace counting, thus achieving an anchorage that could not be disrupted without introducing conditions that would jeopardize their safety.

Enough evidence had been gathered from the writings of the blind to demonstrate the importance of temporal standards to the maintenance of their spatial orientation that it was decided to try this dimension in the pretesting. Time, unlike distance, it was felt, could not be so reliably anchored. The results of pretesting revealed that the time dimension afforded a sensitive index of the degree to which an individual became challenged in his effort to perform successfully on the experimental tasks. Various time intervals were tried with the discovery that intervals of a minute or longer offered little or no possibility of the subjects' devising techniques that would enable them to control judgmental fluctuations.

It would have been possible to choose dimensions other than time; however, it is necessary that the situation be realistic enough to be ego-involving. Further, since spatial orientation is a daily challenge for the blind, and since time and distance are so intimately related for them, the time dimension is ideally suited to the requirements of this study.

By means of the frame of reference concept, the problem confronting the blind may be viewed as the product of being daily confronted with physical and social stimulus situations which are minimal in the amount and variety of stable information necessary for determining an adequate or appropriate response. The result is that the blind must rely more heavily upon developmentally formed attitudes and standards in the determination of their behavior, and the psychological consequences of such situations is that the blind tend to become challenged (ego-involved). When challenged, the blind may be expected to reveal wide fluctuations in their behavior and it is at such times that they are apt to be most susceptible to being influenced by others. Fluctuations in judgmental activities, taken as a prototype of all psychological functioning, can be expected to reflect the way in which becoming challenged influences the behavior of the blind.

The foregoing discussion in general terms receives specific statement in the following hypotheses, which permit a test for their applicability to the blind as they perform under conditions experimentally created to induce varying degrees of ego-involvement.

1. The more uncertain are the physical space conditions for the blind, the greater will be the ego-involvement, in terms of the challenge of the task for the individuals.

2. Judgments of time intervals by the blind will show reliable differences under two degrees of challenge (ego-involvement). (This general statement of the hypothesis is given in terms of a prediction of change in time estimates *per se* and is testable regardless of the sign of change.)

3. There will be significant differences between time estimates in alone and social situtions. (Under the specified conditions of interpresonal relations in this study, time estimates made by pairs of blind individuals judging together will show a reliable shift in the direction of convergence.)

CHAPTER II

SUBJECTS, EXPERIMENTAL SETTING, AND PROCEDURE

Subjects

The subjects for this experiment were selected from the student body at the Oklahoma State School for the Blind at Muskogee, Oklahoma. The population of the school, ranging in age from six to twenty-one, consists of approximately one hundred students, from whom twenty-two were selected as subjects. In order that the conditions of the experiment might be met, those subjects possessing obstacle vision were rejected, as were those whose age (ten years or under) and physical development might work against their participating successfully. Fourteen of the experimental subjects could be classed as having light perception only and eight as totally blind. Of these twenty-two, six were girls and the remainder were boys.

For the social phase of the experiment which related specifically to Hypothesis 3, subjects were matched in terms of age, sex, and in such a way as to minimize strong positive or negative interpersonal ties between them. This was done to insure greater comparability among pairs in view of the small number of subjects available. Information necessary to accomplish this was derived from observing the students in various on-the-campus activities, from informal sociometric interviews, and from such information as could be secured from the staff of the school. It should be specifically noted that the prediction of judgmental convergence in hypothesis 3 would be inappropriate if strong negative interpersonal relations had not been ruled out by criteria of matching. Out of a possible eleven pairs of subjects it was necessary to drop from the social phase of the experiment one pair of boys because of a twelve year difference in ages. It was also necessary to drop from the social phase one pair of girls as a result of one parent's concern for her daughter's well-being.

Experimental Setting

The site for the experiment was at Camp Gruber, an abandoned Army Camp, approximately thirty miles from the school for the blind. The stimulus conditions consisted of a "more challenging" and a "less challenging" course, both of which were remote enough to minimize the intrusion of spectators and were otherwise free from extraneous sounds and obstacles that might in any way constitute a hazard to the subjects or be used by them as anchorages.

The "less challenging" course consisted of a blacktop road, thirty feet wide and bounded on either side by a ten foot wide grassy strip. The "more challenging" course was located approximately two miles away. This course was ninety yards wide and one hundred and fifty yards long, and was covered with short grass. (See Figure 1 for a photograph of the "less challenging" course and Figure 2 for a photograph of the "more challenging" course.) The terrain for the "more challenging" course consisted of mounds which rose to a height of about two feet, patches of level ground, and shallow ditches approximately eighteen inches deep. These ditches and mounds were so numerous and so irregularly located that none of the subjects could traverse the length of the course without encountering them The "more challenging" course, in addition to the natural obstacles constituted by the irregularities of the terrain, was rendered even more challenging by the addition of ropes, which were stretched at various heights of from two to five feet and which zigzagged in various directions across the length of the course. (See Figure 3 for a diagram.) These ropes were secured to steel fence posts, which bordered the entire length of the course and which were spaced at irregular intervals. Since there was some danger that the subjects might walk into these posts, boundaries consisting of heavier rope were stretched along the sides of the course and around the center posts at a distance from the posts sufficient to eliminate the possibility of injury.

Fig. 1. Photograph of the "Less Challenging" Experimental Condition.

Fig. 2. Photograph of the "More Challenging" Experimental Condition.

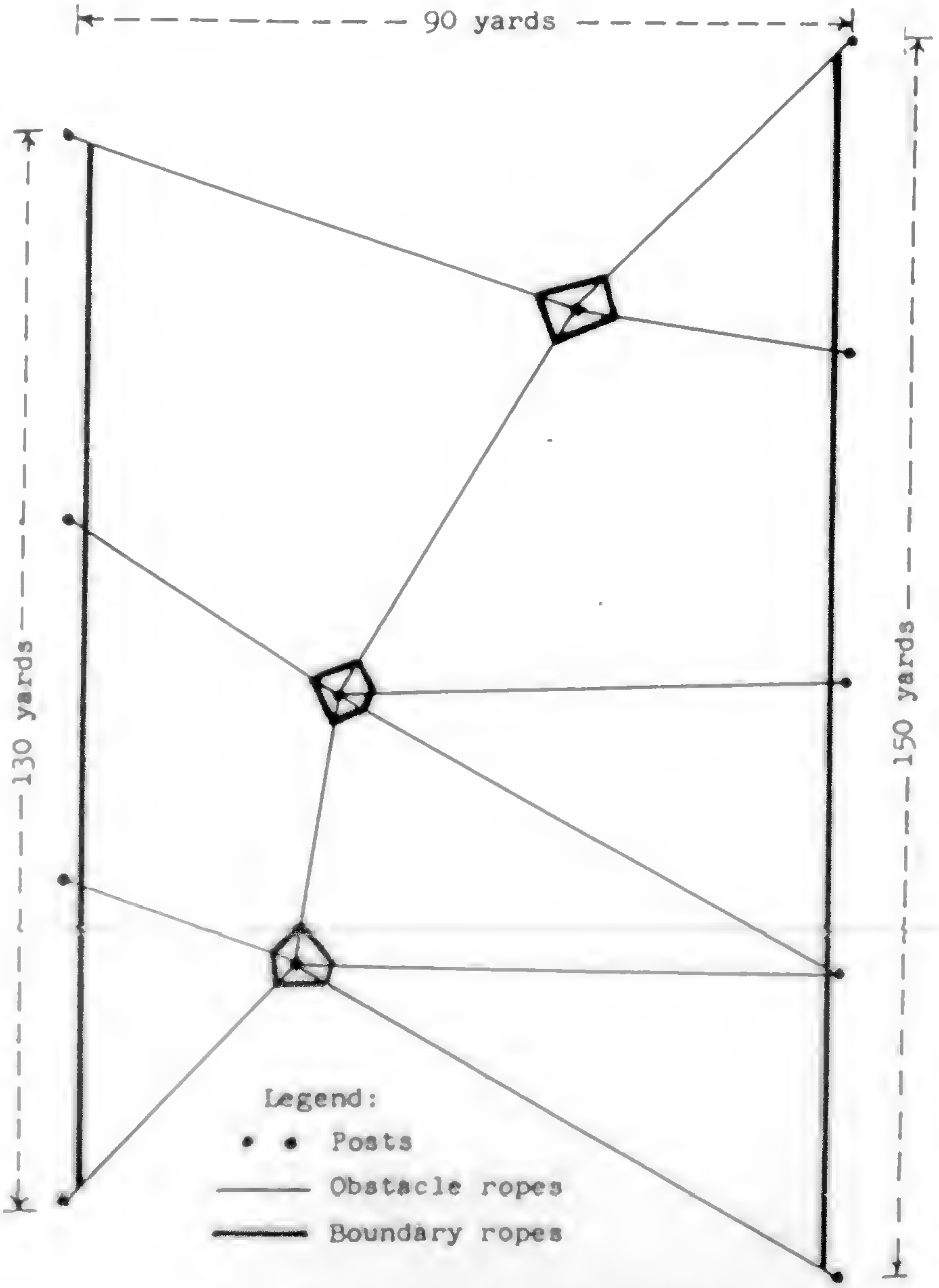

Fig. 3. Graphic representation of the "more challenging" condition.

Procedure

The standard time interval used in the experiment was a duration of 70 seconds, and this interval was the same for all subjects under all conditions. This particular interval was chosen since it was long enough to be susceptible to differential distortion by these conditions and yet short enough to minimize the possibility of fatigue. Immediately preceding each experimental condition, the subjects were given the experimental standard time interval twice. That is, the subjects were asked to walk until instructed to stop and were allowed to walk the standard amount of time, 70 seconds. The time judgments for the "sitting" condition were obtained following presentation of the standard time interval twice, as subjects sat quietly. The "sitting" judgments are taken to represent the least challenging (ego-involving) of the three conditions.

The subjects were required to give five estimates for each condition, both in the individual and social phases of the experiment. The desire to keep fatigue at a minimum was a major consideration in the decision to require only five judgments. Observers were stationed at both ends of the course with stop-watches to record the exact amount of time walked by each subject, so that an accurate record of the judgmental performance of each subject was kept. Observers also recorded any pertinent reactions or comments of the subjects. From two to four subjects were transported to the experimental site at a time; and while each participated in the individual phase of the experiment the rest remained with the third observer some distance from the experimental site. It was during this period that the third observer was able to secure the necessary sociometric data that would permit pairing the subjects to meet the experimental criteria as regards interpersonal relationships.

Two standard walking trials were given the subjects under more and less challenging conditions before they were required to give their judgments. Prior to the presentation of the standard trials, the subjects were informed as to the general nature of the course. Some such statement as "this course is smooth (or rough, with ropes stretched across it)" was sufficient to ward off the possibility of the subjects coming to feel that they were being tricked or surprised by the experimenters. The standard trials were given under conditions identical to those under which the subjects were required to perform. The following instructions were given before the presentation of the experimental standard.

> What we are going to be doing is something like your "travel training." We'll start off by having you walk a certain length of time and then later you'll judge this same length of time yourself.
>
> The ground ahead of you is smooth (rough). (If the course was rough, subject was told, "There are some ropes across your path and when you come to one you can either go over it or under it--suit yourself. If you should come to a heavy rope like this one

> [letting the subject examine the rope] then move away from it.") When I tap you on the shoulder, start off the way you are facing and keep walking until you are told to stop. O. K.?

All or part of the instructions were repeated if the subject indicated he did not understand what he was to do. The second presentation of the experimental standard time was explained simply, "We want you to do this once more so you'll have a good idea of the time you'll be walking later."

When the first test trial began the subject was instructed:

> O.K., now when I tap you on the shoulder walk for the same length of time as you just walked and when you think that the time is up, stop, hold up your hand, call out "O. K.," and then wait until one of us gets there.

On the next trial, the subject was told:

> O. K., now just do the same thing again. Walk the way you are facing for the same length of time. (This was repeated on subsequent trials.)

These instructions were given to the subjects performing in the "individual" phase of the experiment, and the order of performance with respect to the more or less challenging conditions was counterbalanced, thus affording a check against systematic order effects.

Essentially the same instructions were given for the social phase of the experiment. The act of calling out did, in effect, constitute a suggestion which the partner could accept or reject. More and less challenging conditions were also counterbalanced in order of presentation in this phase of the experiment.

It was not possible to counterbalance the performance of the subjects with respect to the social and individual phases of their performance inasmuch as the number of pairs available (nine) would have rendered the attempt useless for statistical purposes.

The estimates while sitting were taken at the end of the experimental trials so that they were comparable for all subjects.

A method for determining how the subjects ranked the two experimental courses as to challenge had been devised and was administered at the conclusion of the experiment. On the basis of information secured from the students during the pretest, it was possible to formulate a series of questions which would indicate more or less difficulty encountered by the subjects traveling to and from places they were known to frequent. Key words and phrases, descriptive of and equivalent to "difficulty" were those customarily used by the subjects. By means of these questions a scale of challenge was established for each subject, and it was possible by inserting questions about the experimental conditions to gain a more accurate idea of just how successful was the attempt to create experimentally physical space conditions that would reliably be regarded by the blind as more and less challenging.

Each subject was given a yardstick and was asked to respond to each of the following questions by sliding his hand along it to a point that indicated "how much bother or trouble" a person would have getting to or from that place:

1. How much trouble would it be walking from the cottage to the dairy barn?
2. How hard is it to go downtown alone?
3. How about going from the cottage to the dining room?
4. How about going down to the cafe at the corner of York and Gibson?
5. How much trouble would it be going from the cottage to the gym?
6. How about getting around at Camp Muskogee?
7. How about going from classroom to classroom in the same building?
8. How about that first (second) place you walked today?
9. How about getting around in stores downtown?
10. How about going up and down familiar stairsteps?
11. How about that second (first) place you walked today?
12. How about getting around in your room?

CHAPTER III

RESULTS

Hypothesis 1

Responses of all subjects to all items composing the scale of challenge are presented in Appendix A. Inspection of these data reveal that the portion of a 36 inch scale utilized differed from subject to subject, with one subject (O) using the full scale and another (X) placing all judgments within an 8.5 inch segment. Also, not all subjects utilized the same portion of the scale, even in instances where ranges of judgments were approximately equal. For example, for two subjects using 21 inch (M) and 22 inch (Y) segments of the scale, the portions utilized were 0 inches to 21 inches and 6 inches to 28 inches, respectively.

There were some indications that these individual differences in the manner in which the scale was developed and handled were related to differences in ability and previous experiences. For example, the subject (Y) who used the 6 inch to 28 inch segment (giving no judgments of "zero difficulty") was an overprotected girl who did, in fact, experience greater difficulty in getting around than any of the other subjects. The boy (B) who indicated greatest difficulty in getting around at a local camp had experienced a painful accident there.

The purpose of the scale of challenge was to provide a number of comparison items which were real in the experience of each subject, in which could be embedded the two crucial items--estimates of the relative difficulty or challenge of the more and less challenging experimental conditions for that subject. In line with Hypothesis 1, it was desired to determine, in a context which was meaningful to subjects and which would not, itself, challenge subjects to deny any difficulties in getting around, whether the experimental condition designed to represent greater uncertainty was reliably judged to be more difficult, challenging, ego-involving.

The data, as summarized in Table 1, were analyzed to determine whether the direction of estimated increasing challenge was as predicted. The direction of difference for each subject was characterized as plus (the less certain condition judged more challenging) or minus (the less certain condition judged equal or less challenging). Only one subject (G) appears as a negative case, and he gave judgments of "no difficulty" for both conditions. Consultation of tables values for the Sign Test with small $\underline{N}$ (16, p. 458) reveals that Hypothesis 1 is supported at $\underline{P} < .001$. That is, the experimental subjects reliably judged the degree of trouble,

Table 1

Subject Estimates of the Two Experimental Conditions on the Scale of Challenge*

	Subject	"More Challenging" Condition	"Less Challenging" Condition	Difference
Boys:	A	35.50 in.	0.00 in.	35.50 in.
	B	19.00 "	6.00 "	13.00 "
	C	13.00 "	3.00 "	10.00 "
	D	9.00 "	2.00 "	7.00 "
	E	0.50 "	0.00 "	0.50 "
	F	24.00 "	0.00 "	24.00 "
	G	0.00 "	0.00 "	0.00 "
	H	27.50 "	2.00 "	25.50 "
	I	30.00 "	4.00 "	26.00 "
	J	2.00 "	1.50 "	0.50 "
	K	10.50 "	2.50 "	8.00 "
	L	9.00 "	0.75 "	8.25 "
	M	21.00 "	0.25 "	20.75 "
	N	16.00 "	5.50 "	10.50 "
	O	9.00 "	0.50 "	8.50 "
	P	11.00 "	6.50 "	4.50 "
Girls:	U	19.00 "	0.00 "	19.00 "
	V	4.50 "	0.75 "	3.75 "
	W	18.00 "	0.50 "	17.50 "
	X	10.00 "	0.00 "	10.00 "
	Y	21.00 "	15.00 "	6.00 "
	Z	15.50 "	0.25 "	15.25 "

*Subject identifications are consistent for all tables.

bother, difficulty--ego-involvement--under the "more challenging" conditions to be greater than under the "less challenging" conditions.

Hypothesis 2

Data collected in connection with Hypothesis 2 are entered in Appendix B. These include five time estimates made by each subject under each of the experimental conditions--more challenging and less challenging travel conditions and, in addition, five estimates of the same objective time made by each subject while sitting quietly--the "Sitting" estimates.

The "Sitting" estimates were obtained under conditions of, presumably, minimal challenge and distraction, and are considered in the following analysis to represent a condition of least challenge or ego-involvement.

A median of the five estimates made by each subject under each condition was computed and recorded in Table 2.

Utilizing the medians in Table 2 as single estimates of the judgmental performance of each subject under each condition, an Analysis of Variance by Ranks (16, pp. 438-440) was performed to determine whether the experimental conditions were responsible for reliable differences in time estimates. This analysis is appropriate for data, such as the above, where estimates were obtained from each subject under three conditions, i.e., for related measures.

The median estimates for each subject were ranked 1, 2, and 3 in order of size, and columns (representing conditions) were totaled. The totals were: for sitting estimates, 36; for less challenging conditions, 54; and for more challenging conditions, 42. On the assumption of equal totals if there are no conditions effects, computed

Table 2

Median Time Estimates for all Subjects Under Three Degrees of Ego-involvement: Individual Sessions*

Subject	Sitting Estimates	Less Challenging Condition	More Challenging Condition
A	77 Sec.	73 Sec.	69 Sec.
B	68 "	190 "	376 "
C	82 "	186 "	276 "
D	75 "	71 "	90 "
E	73 "	69 "	66 "
F	63 "	77 "	84 "
G	78 "	76 "	73 "
H	69 "	74 "	80 "
I	48 "	144 "	76 "
J	47 "	60 "	53 "
K	83 "	90 "	84 "
L	75 "	100 "	137 "
M	54 "	70 "	41 "
N	40 "	82 "	58 "
O	118 "	78 "	70 "
P	39 "	103 "	68 "
U	73 "	96 "	66 "
V	72 "	115 "	62 "
W	72 "	184 "	62 "
X	69 "	102 "	90 "
Y	50 "	54 "	40 "
Z	54 "	64 "	118 "

*Subject identifications are consistent for all tables.

chi-square is 7.31. Converted into F for evaluation, in view of sample size, the probability of differences in rank totals of the size obtained is < .05. Obtained F is 4.18, adjusted degrees of freedom 1.91/40.11.

There are, then, reliable differences in time estimates under the three conditions--when sitting estimates are included in the analysis as representative of least degree of challenge. In order to determine between what pairs of conditions there are reliable differences, Sign Tests (16, pp. 430-431) were performed. This test is equivalent to assigning ranks of 1 (minus) and 2 (plus) to each pair of measures from the same subject, and its use is therefore congruent with the distribution-free analysis of variance utilized above.

Sitting estimates were reliably smaller than estimates made under less challenging conditions. Seventeen subjects made larger estimates under less challenging conditions, 5 under sitting conditions, $P = .05$. Estimates under more challenging conditions were not reliably larger than sitting estimates. Thirteen subjects made larger estimates under more challenging conditions, nine under sitting conditions, $P > .25$. Estimates under more challenging conditions were not reliably smaller than those under less challenging conditions. Fifteen subjects made larger estimates under less challenging conditions, 7 under more challenging conditions, $P = .25$.

Hypothesis 2 is not, then, supported by these data, as analyzed. The only reliable difference among conditions represents a tendency to make longer estimates of an objective time of 70 seconds while walking along a smooth roadway than while sitting quietly. The apparent tendency to make longer estimates under less challenging conditions than under more challenging conditions is not reliable.

Hypothesis 3

The data collected which are relevant to Hypothesis 3 are found in Appendix C. These again constitute five estimates of an objective time of 70 seconds per subject under two conditions--the more and less challenging travel conditions utilized in the alone phase previously. The social phase of the study followed the alone phase for all subjects.

Subjects were matched for the social phase by criteria as outlined in the procedure section, and data in Appendix C are presented for pairs of subjects performing the task alone, and later together. Hypothesis 3 is tested in terms of convergences of the time estimates of pairs of subjects under the specified conditions of interpersonal relations in this study. Time estimates of the subjects in pairs differed when they estimated alone, but since initial judgmental differences were a less pressing consideration in subject matching than age, sex, friendship, etc., a number of the initial differences between subjects' estimates are small. Consequently, the emphasis in the analysis to follow is on direction of change under these specified conditions.

For each pair of subjects a convergence, or difference-between-differences, score was derived. From the difference between median estimates of each subject in a pair in the alone situation, the difference between median estimates of each subject in the same pair in the social situation was subtracted. The results represent convergence toward some common estimate, if positive, and divergence, if negative. Two convergence scores are thus obtained for each pair of subjects. Those under less challenging conditions are presented in Table 3, those under more challenging conditions in Table 4.

Available for analysis, then, are two sets of nine convergence scores obtained under different experimental conditions from the same pairs of subjects. Since the two sets of scores are not independent they are tested for reliability of convergence separately by means of the Signed Rank Test for Paired Observations (16, pp. 432-434). This tests whether the difference-between-difference scores are symmetrically distributed around zero, i.e., the extent to which the data reveal significantly more convergence than divergence.

Ranks were assigned convergence scores obtained under less challenging conditions, and ranks were prefixed with the appropriate sign (positive for convergence and negative for divergence). The sum of negative signed ranks was zero, $\underline{P} < .01$, there being no cases of divergence. Following the same procedure with convergence scores obtained under more challenging conditions results in a sum of negative signed ranks of 2, $\underline{P} = .01$, there being one case of

Table 3

Median Time Estimates and Convergence Scores for Pairs of Subjects in Alone and Social Situations: Less Challenging Conditions*

Subject Pairs	Alone	difference	Together	difference	Convergence Score**
A	73	117	71	2	115
B	190		73		
C	186	115	245	3	112
D	71		248		
E	69	8	63	2	6
F	77		65		
G	76	2	84	0	2
H	74		84		
I	144	84	101	21	63
J	60		80		
K	90	10	92	0	10
L	100		92		
M	70	12	60	2	10
N	82		62		
U	96	19	162	0	19
V	115		162		
W	184	82	141	0	82
X	102		141		

*Subject identifications are consistent for all tables.

**Alone difference minus together difference. Positive numbers represent convergence of judgments.

Table 4

Median Time Estimates and Convergence Scores for Pairs of Subjects in Alone and Social Situations: More Challenging Conditions*

Subject Pairs	Alone	difference	Together	difference	Convergence Score**
A	69	307	80	12	295
B	376		92		
C	267	177	246	0	177
D	90		246		
E	66	18	65	1	17
F	84		66		
G	73	7	92	15	-8
H	80		77		
I	76	23	61	9	14
J	53		52		
K	84	53	95	27	26
L	137		122		
M	41	17	62	0	17
N	58		62		
U	66	4	132	0	4
V	62		132		
W	62	28	136	0	28
X	90		136		

*Subject identifications are consistent for all tables.

**Alone difference minus together difference. Positive numbers represent convergence of judgments.

divergence.

Thus Hypothesis 3 is supported by the data at and beyond the .01 level under the two experimental conditions.

It may also be determined from these data whether more convergence occurred under one experimental condition than the other. Differences between convergence scores of the same pair of subjects under more challenging and less challenging conditions were computed and again the Signed Rank Test for Paired Observations was utilized. The smaller signed rank total (that representing larger convergence scores under less challenging conditions) was 19, which is not significant. It would have had to be equal to or smaller than 6 at the .05 level. It does not appear, then, that degree of convergence was related to experimental conditions of greater and lesser challenge as here measured.

CHAPTER IV

DISCUSSION AND IMPLICATIONS

The study and findings just presented pertain to space orientation and time estimates of blind individuals (a) under physical space conditions which are more and less challenging to them, and (b) in alone and together situations under these more and less challenging conditions. These findings point to certain theoretical and practical implications. These implications indicate that the problems of the blind may be profitably related to certain basic psychological principles and that there are methodological advantages in utilization of blind individuals as subjects in psychological research.

Problems of the Blind and Basic Psychological Principles

This study ties together first-hand observations and reported experiences of the blind with certain basic psychological principles which were utilized in organizing these reports in the introduction. Among the more useful and pertinent of these principles were those related to anchorages, social attitudes, and ego-involvements. All these and other empirical observations utilized are grounded in empirical and experimental research on the psychology of judgment and ego-involvement (Chapter I).

In the empirical observations quoted from blind authors the overwhelming importance of space orientation to the blind could be seen. For example, Ohnstad (10) and Barry (2) concluded that space orientation was, for them, a tenuous affair requiring constant attention to their surroundings. Even so, confusion and disorientation with attendant loss of confidence were likely to result at any time through loss of contact with the important environmental landmarks of the moment. In short, as a result of their handicap, the blind suffer from a lack of stable anchorages and from an uncertainty of the anchorages available to them. Experimental literature in psychology is replete with evidence that lack or loss of stable anchorages results in fluctuations observable in perceptual and judgmental distortions, shifting and variable behavior, uncertainty, and insecurity. These problems of the blind can advantageously be drawn together and understood in terms of their ego-involvements and their attempts to secure and maintain stable relationships with their environment.

The blind authors, Fox (7) and Villey (15), pointed to the extent to which the blind necessarily use time estimates in their attempts to maintain spatial orientation, Villey even contending that space is largely translatable into time for the blind. Barry (2) and Fox (7) related incidents in which wide fluctuations of experienced time resulted from important events in their lives. First hand observations of the blind support the assertions of the authors concerning the scarcity and instability of available spatial anchorages. Loss or lack of anchorages produces uncertainty and insecurity with accompanying behavioral fluctuations. Almost immediately the matter becomes an ego-issue, i.e. a challenge of maintaining consistency. Finally, there are attempts to establish some sort of stable anchorages at almost any cost.

This study, as a starting point, shows that physical space conditions may be so organized as to constitute gradations of challenge (loss of anchorages with resulting ego-involvement) for blind subjects (Hypothesis 1). However, gradations of challenge are not reliably revealed through judgmental differences (Hypothesis 2) except in the instance of the significant difference between the "sitting" estimates and the comparatively longer estimates under the "less challenging" conditions. Judgments under "more challenging" conditions, on the whole, tended to be shorter than those made under "less challenging" conditions but longer than estimates made under "sitting" conditions, however, in neither case significantly so.

The findings with respect to Hypothesis 2 are equivocal. Viewing the "sitting" condition as the least challenging of the three under which time estimates were obtained, the findings tend to support the prediction of a relationship between judgmental change and increasing ego-involvement. The fact remains, however, that the time estimates under "less" and "more challenging" conditions were not reliably different, even though the subjects reported a reliable difference on the scale of challenge. A reasonable explanation of this obtained discrepancy between scale of challenge and time estimates data on "less" versus "more challenging" conditions may be that while the difference in challenge was great enough to be reflected in ratings of the conditions, it was not sufficiently great to produce reliable differences in time estimates.

These inconclusive results cannot be taken as warranting a revision in the predicted effects of ego-involvement on judgmental and perceptual activities of the blind. Accumulating experimental evidence on the influences of uncertainty, unstructuredness, loss of anchorages (cf. 11 and 13) on behavior constitutes strong support for concluding that the equivocality of results may best be assigned to lack of sufficient differentiation between the "more" and "less challenging" conditions. Under conditions of uncertainty or unpredictability, where anchorages are unstable or absent, persons tend to become anxious and to strive to structure their environment. Initially, at least, the uncertainty and instability of their environment is painful and threatening and is accompanied by heightened fluctuations in behavior.

Under such conditions, personality factors and the experience of unique individuals are, of course, weighty determinants of the manner in which ego-involvement and judgmental performance are related for the given individual. An important point for future research is to determine the conditions under which ego-involvement stemming from ill-defined or uncertain physical space conditions is productive of variations in perceptual functioning and judgmental performance, and the way in which individual differences contribute to these phenomena. It is to be expected that the problems of the blind in achieving and maintaining stable relationships with their environment are not altogether different from those of the sighted. Special conditions obtain in the case of the blind as a result of their handicap, but the same psychological principles developed in general psychology hold true. Attempts to understand, and to resolve, the special problems of the blind stand to gain much from application of such established knowledge from general psychology.

It is to be expected that the feasibility of the application of established psychological principles to the problems of the blind would be even greater with respect to the influence of social factors. In this area the problems of the blind and sighted have even more in common. A survey of the reports of blind authors (Chapter I) and the results of the social phase of this study reveal that such, indeed, is the case.

A finding of this study which deserves special emphasis is the extent to which social influences constituted compelling anchorages. The initial disparity between time estimates of pairs of individuals judging alone was reduced in the social situation almost to the vanishing point. In line with Hypothesis 3, pairs of subjects converged on some common time estimate when judging together, whatever their estimates when judging alone might have been, and this was true for both the less and more challenging experimental conditions.

During the individual phase of the experiment there were no clear-cut standards in terms of which the subjects could anchor their judgments. With the introduction of the social factor, however, a definite anchorage in the form of clear-cut pre-existing interpersonal attitudes was available to the subjects. The effect of the social factor was to reduce to some extent the subjects' feeling of insecurity and uncertainty. Subjects' remarks to each other are illustrative, e.g., Subject X to Subject W, "I feel safer walking with someone else than alone." Subject W, "Me too."

A further important finding is that, although subjects displayed in their judgments in the social phase a consistent tendency toward convergence, on the whole this convergence is not an average of the subjects' judgments made alone. The Muskogee School for the Blind constituted a rather close-knit community of individuals who held rather definite attitudes towards each other and who, as a consequence, occupied definite roles and statuses. Despite the matching procedures which ruled out extremes of status and role relations, it is altogether likely that the nature of interpersonal relationships exercised an important influence in determining both the direction and amount of judgmental change for each subject. Because of the theoretical significance of interpersonal relationships and their practical implications for difficulties of the blind, problems of this nature definitely warrant further study.

Methodological Advantages of Blind Subjects for Research

Residential populations of blind individuals, such as are to be found in schools and rehabilitation centers, constitute a ready source of subjects for psychological experimentation. These individuals live under conditions representing such a lack of stable anchorages as would be difficult to duplicate for sighted subjects. Blindness is surcharged with meanings and interpretations that obscure issues and obstruct understanding for both blind and sighted individuals. The impact of such a confused state of affairs on the blind tends to increase the number and variety of situations that may constitute a threat to ego stability. The uncertainty of physical space conditions, brought on by blindness, is more often than not aggravated by society's inconsistent and contradictory reactions to the presence of blind individuals in its midst. The effect on the behavior of the blind is remarkably similar to that of persons who occupy positions of marginality with respect to particular groups and classes of individuals.

The blind, as was shown in Chapter I, are deeply concerned lest they be regarded as helpless or different from others. In their attempt to resolve the dilemma in which they find themselves they may run the gamut from an unquestioning acceptance of the stereotype of the blind to an outright refusal to admit that blindness imposes any serious limitations. In the latter case they frequently shun all associations with other blind individuals and have in some instances been known even to deny the fact of their own blindness. Somewhere between these two extremes, however, the vast majority of the blind, reflecting in their adjustment varying degrees of compromise, are to be found. The fear of being regarded as helpless and different from others is at the basis of the blind's refusal to accept or request assistance in getting about. The white cane and dark glasses are often spurned, too, since for many these are regarded as the badge of the blind beggar. Fox's reaction is illustrative. "Nearly everyone associates a cane with a blind man, and not only with blind men but the helpless, begging kind of blindness" (7, p. 185). Blindness not only limits the scope of physical activity but also tends to inhibit the development of or result in the sloughing off of certain attitudes relating to the self.

The blind populations of educational and rehabilitation centers, while being prepared for a wide variety of activities, are also learning in a less formal manner the "do's" and "don't's" necessary for getting along with sighted persons. Heavy stress is laid upon the importance of being like sighted people with the result that many become hypersensitive to situations that may in any way reveal the limitations imposed by blindness. Expressions of pity from the sighted are particularly painful to the blind as is revealed by Ohnstad, "They swelled our heads with admiration for our work, then deflated us with pity" (10, p. 129).

The kind of relationship the blind wish to maintain with sighted individuals is typified in Barry's remarks:

> . . . people forgot that I couldn't see and frequently asked me to hand them something or to do something that was an impossibility. Actually, I liked that to happen because it meant that they had forgotten I was blind, that they accepted me as a person, not as a blind man (2, p. 120).

The ever present threat of becoming confused and disorganized keeps the blind in a heightened state of anxiety, and much of their thought and effort is expended in an attempt to structure their environment and stabilize their relationships with sighted persons, thereby lessening their anxiety. When viewed from a psychological standpoint their behavior is as readily understandable as is that of other individuals caught in similar situations, where definite structure and meaning are not readily discernible. It has already been seen that basic psychological principles are applicable to the problems of the blind. Conversely, experimentation with blind subjects may contribute greatly to knowledge of the performance of individuals in situations characterized by instability. Of course, contributions to general psychological knowledge made by blind individuals serving as subjects for experimentation will benefit the efforts of those who are actively engaged in formulating training programs for the blind through application of new insights into their problems.

Some Practical Implications

The findings of this study suggest certain practical applications, particularly in terms of the training of the blind. The traditional emphasis in training institutions has been on development of self-reliance--on ability to meet and handle a variety of stimulus situations unaided. Chevigny noted the effect such training may have on the blind:

> . . . even with the comparative youngsters who had such excellent training at Avon and whose physical

> aptitudes were good, it has been the observation of many that they go about as they were taught to do with great anxiety and strain on the personality. Whether merely looking independent is necessarily also being independent is a question which, with most of these youths, has not been asked (5, p. 385).

There are strong indications in this study of the psychological cost of independence and self-reliance and of the tendency to place greater reliance on interpersonal relations when these are possible. It is in this area that the blind encounter some of their greatest adjustment problems, for blindness, in and of itself, can account for only a part of the difficulty. The blind and sighted both reveal in their reactions to each other the existence of attitudes that frustrate their efforts to establish stable interpersonal relations.

Those who are responsible for the education and training of the blind must have a clear understanding of the complexity of their undertaking. The blind themselves must be taught to understand and to evaluate their position in society realistically; for, until they do, they cannot hope to effect significant changes in the attitudes of sighted individuals. Any behavioral manifestations of the blind that may in any way appear objectionable to teachers or to the family tend to be explained as the product of blindness, and the blind person comes to understand that such deviations are objectionable primarily because they advertize the fact of his blindness. No amount of training or education can hope to alter the fact of blindness, nor should the blind be encouraged to expect that the elimination of superficial mannerisms will thereby seriously lessen the effects of blindness. The issue for the blind is not one of complete independence and self-reliance on a par with sighted individuals but rather one of determining the maximum degree of self-sufficiency possible under conditions of blindness. Allowance, however, must be made for individual differences in ability and temperament of the blind, since adjustment to any given situation is ultimately a highly personalized matter.

It may well be that the training in interpersonal relationships incidental to the formal training program in institutions has contributed more to the ability of the blind to adjust to society satisfactorily than has been realized. If such is the case, the social life of these institutions may be further integrated into the formal program of the institution with great benefit to the blind student. That is, a balanced training program in self-reliance and effective dependence (the ability to acknowledge and accept needed assistance without feeling threatened) may well be more in line with what is established in empirical writings and verified experimentally in this study concerning the problems of the blind.

This study has demonstrated the importance of interpersonal relationships to the adjustment of the blind. The finding that the social factor tended to minimize the importance of individual differences in judgmental scales under experimentally produced stimulus situations of uncertainty warrants further study; for it is in the area of interpersonal relationships that the blind encounter some of their most serious adjustment problems.

Systematic studies varying both stimulus and social situations through further degrees will help to clarify the relative importance of these factors on the psychological functioning of the blind and to set the limits within which each factor may be expected to exercise maximal influence on behavior. Such studies could supply information of immediate usefulness to those responsible for the training and education of the blind. Of equal importance to psychology would be any findings that might further the knowledge and understanding of the development and functioning of the self of the individual under realistic conditions of situational uncertainty and psychological stress.

CHAPTER V

SUMMARY AND CONCLUSIONS

Empirical and experimental evidence and theoretical contributions were surveyed with the aim of stating fruitful hypotheses about the psychological functioning of the blind. Much evidence points to an intimate relationship between judgmental performances of the blind and their tendency to become challenged (a special case of ego-involvement) by physical stimulus conditions which are perceived as more or less unpredictable. Situations of motivational significance for the person, which are lacking in stable, meaningful anchorages result in attempts to resolve the attendant difficulties. The resolution of doubt and uncertainty ultimately depends upon the person's ability to discover meaningful, or reliable, social and physical anchorages, in terms of which his behavior can be rendered appropriate to the demands of the situation.

The blind are daily confronted with the task of resolving doubt and uncertainty in physical and social situations which constitute little or no difficulty for the sighted. Under such conditions, the importance of internal standards (derived from previous experience) and social factors in the situation (interpersonal relations and the behavior of other persons) is maximized. Perception of time and distance are intimately related factors for the blind, and it is through these factors that an experimental study of situational uncertainty with its attendant ego-involvement and attempts at resolution by means of internalized standards and interpersonal interaction can be made.

The hypotheses formulated for testing are as follows:

1. The more uncertain are the physical space conditions for the blind, the greater will be the ego-involvement, in terms of the challenge of the task for the individuals.

2. Judgments of time intervals by the blind will show reliable differences under two degrees of challenge (ego-involvement). (This general statement of the hypothesis is given in terms of a prediction of change in time estimates *per se* and is testable regardless of the sign of change.)

3. There will be significant differences between time estimates in alone and social situations. (Under the specified conditions of interpersonal relations in this study, time estimates made by pairs of blind individuals judging together will show a reliable shift in the direction of convergence.)

Twenty-two subjects from the Oklahoma School for the Blind at Muskogee, Oklahoma, were selected for this study by means of pre-established criteria. Of these, eight were totally blind and fourteen had light perception only. Six were girls and sixteen were boys.

An experimental site was established at abandoned Army Camp Gruber, where two travel "conditions" of differing degrees of certainty or predictability were prepared. The "less challenging" condition consisted of an asphalt roadway free of obstructions. The "more challenging" condition consisted of rough terrain across which ropes were stretched at various heights and in an irregular pattern. Subjects, walking under the two experimental conditions, were, at all times, protected by boundary ropes, etc., from undue hazard.

In the initial phase of the study (individuals performing alone) subjects were asked to walk under one of the two conditions until told to stop. After walking for a period of 70 seconds for two successive trials, they were asked to walk again and, this time, to stop and call out when the same interval had passed. Five such estimates were recorded for each subject under each experimental condition. The two experimental conditions were counterbalanced in order of presentation.

For the second or social phase of the study, subjects were matched so as to avoid strong positive or negative interpersonal relations, sex differences, and large age differences. They then experienced the same experimental conditions in pairs, again in counterbalanced order. And again, five time estimates were recorded for each subject following two presentations of the standard time.

The same procedure of presenting the standard time twice and requesting the subjects to estimate it themselves five times was followed later with subjects sitting quietly, individually, so as to achieve a measure of their ability to estimate time when conditions were not disruptive of their internalized standards, i.e., a condition of least challenge. At this time, they were also asked to respond to the items of a "scale of challenge" which had been constructed for the purpose of determining whether they perceived the two walking conditions as differentially ego-involving. Items were phrased in terms of how much trouble or difficulty might be expected in getting around under conditions with which they were familiar. The two walking conditions were inserted among the other items, and subjecta indicated the relative challenge involved for each item on a scale of 0 to 36 inches by running their hands to the appropriate point on a yardstick.

The findings of the study may be stated in the following summary form, in terms of the hypothesea:

1. Subjects rated the less predictable, less certain, travel conditions as significantly more challenging than the more predictable conditions.

2. Hypothesis 2 was not confirmed by these data, as analyzed, the only significant difference being between time

estimates made by subjects as they sat quietly and as they walked along a smooth roadway (the "less challenging" condition). Differences between estimates under "more" and "less challenging" conditions were not significant. The interpretation given these findings, though not clearly supported by them, is in line with accumulating relevant evidence.

3. Time estimates for pairs of subjects were found to show significant changes (convergences) on the social phase as compared to the individual phase. Convergence was significant under both conditions of challenge ("more" and "less challenging"), but degree of convergence was not different under these two conditions.

The theoretical implications of the findings were discussed, and suggestions were offered for further profitable experimental research with the blind. Finally, practical applications of the findings were pointed out for training the blind to cope with their daily problems of physical and social orientation.

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APPENDIX A

Subject estimates on the Scale of Challenge, in inches

Scale Item	Subjects A	B	C	D	E	F
1	1.5	14.0	9.0	10.0	0.0	0.0
2	6.25	32.0	22.0	24.0	9.0	18.0
3	1.0	27.0	19.0	16.0	.25	12.0
4	.5	33.0	23.0	16.0	1.5	15.0
5	.5	31.0	11.0	9.5	.25	6.0
6	25.0	31.0	24.5	20.0	1.0	21.5
7	.25	10.0	8.0	9.0	0.0	3.5
8	35.5 **	19.0**	13.0**	9.0 **	.5 **	24.0**
9	17.0	28.0	27.0	7.0	1.0	13.0
10	0.0	3.0	5.0	2.5	0.0	0.0
11	0.0 *	6.0*	3.0*	2.0 *	0.0 *	0.0*
12	0.0	7.0	2.5	1.25	0.0	0.0

Scale Item	Subjects G	H	I	J	K	L
1	0.0	.5	15.5	1.0	3.0	4.0
2	5.0	11.0	35.0	11.0	-.-	12.0
3	0.0	1.5	2.0	22.0	3.0	6.0
4	1.0	4.5	33.0	19.0	4.0	13.0
5	0.0	2.0	3.5	3.0	3.0	3.0
6	15.0	25.0	28.5	20.0	-.-	26.0
7	0.0	0.0	3.75	2.0	3.0	2.0
8	0.0**	27.5**	30.0 **	2.0**	10.5**	9.0**
9	19.0	30.0	26.0	6.0	8.0	4.0
10	0.0	5.5	1.75	1.5	3.0	1.0
11	0.0*	2.0*	4.0 *	1.5*	2.5*	.75*
12	0.0	0.0	2.5	1.0	2.0	.25

*Response on item referring to the less challenging condition.

**Response on item referring to the more challenging condition.

APPENDIX A--Continued

	Subjects			
Scale Item	M	N	O	P
1	1.25	0.0	0.0	4.0
2	5.0	19.0	-.-	9.5
3	.5	0.0	-.-	1.5
4	2.5	10.5	-.-	9.0
5	.5	0.0	.75	6.5
6	15.0	19.5	-.-	11.0
7	1.0	0.0	.75	5.5
8	21.0 **	16.0**	9.0 **	11.0 **
9	13.0	19.5	36.0	14.5
10	1.5	0.0	.25	5.25
11	.25*	5.5*	.5 *	6.5 *
12	0.0	0.0	.25	5.5

	Subjects					
Scale Item	U	V	W	X	Y	Z
1	9.0	1.5	1.0	4.0	10.5	.5
2	29.5	-.-	-.-	18.5	27.0	33.0
3	5.0	-.-	-.-	8.5	28.0	29.0
4	32.0	30.0	3.0	5.0	28.0	28.0
5	2.0	1.5	1.5	2.0	9.0	5.0
6	20.0	-.-	-.-	9.0	19.0	-.-
7	2.0	1.0	10.0	2.0	13.5	3.5
8	19.0 **	4.5 **	18.0 **	10.0*	21.0**	15.5**
9	29.5	33.5	16.0	12.0	12.5	11.0
10	1.0	1.0	1.75	0.0	16.0	2.5
11	0.0 *	.75*	.5 *	0.0*	15.0*	.25*
12	.25	0.0	.25	0.0	6.0	4.25

APPENDIX B

Time estimates of all subjects under three experimental conditions in the alone situation*

More Challenging to Less Challenging Order

Subject	Sitting	Less Challenging	More Challenging
C (M.**, T.***)	97 sec.	92 sec.	165 sec.
	78 "	155 "	171 "
	75 "	186 "	431 "
	82 "	274 "	267 "
	96 "	313 "	328 "
O (M., T.)	79 "	76 "	62 "
	103 "	74 "	75 "
	78 "	84 "	73 "
	66 "	78 "	72 "
	68 "	74 "	75 "
L (M., T.)	73 "	100 "	76 "
	78 "	82 "	124 "
	75 "	95 "	137 "
	77 "	132 "	140 "
	74 "	119 "	142 "
V (F., T.)	56 "	70 "	56 "
	64 "	115 "	71 "
	73 "	120 "	70 "
	72 "	126 "	60 "
	75 "	110 "	62 "
F (M. LPO.)	63 "	77 "	84 "
	68 "	88 "	89 "
	71 "	77 "	87 "
	61 "	78 "	82 "
	63 "	66 "	77 "

*Estimates are listed in the order in which they were made.

**M. - male; F. - female

***T. - totally blind; LPO. - light-perception-only

APPENDIX B--Continued

More Challenging to Less Challenging Order (Continued)

Subject	Sitting	Less Challenging	More Challenging
I	68 sec.	151 sec.	132 sec.
(M., LPO.)	43 "	152 "	62 "
	48 "	134 "	61 "
	44 "	130 "	83 "
	53 "	144 "	76 "
K	80 "	80 "	84 "
(M., LPO.)	83 "	89 "	78 "
	81 "	91 "	83 "
	84 "	104 "	108 "
	79 "	90 "	98 "
M	62 "	66 "	48 "
(M., LPO.)	69 "	59 "	34 "
	49 "	70 "	40 "
	54 "	80 "	45 "
	53 "	71 "	41 "
O	95 "	52 "	58 "
(M., LPO.)	124 "	81 "	70 "
	118 "	84 "	82 "
	126 "	68 "	64 "
	108 "	78 "	76 "
U	72 "	74 "	72 "
(F., LPO.)	92 "	95 "	78 "
	63 "	110 "	60 "
	79 "	96 "	66 "
	73 "	114 "	64 "
W	72 "	93 "	74 "
(F., LPO.)	62 "	184 "	64 "
	79 "	170 "	62 "
	59 "	213 "	57 "
	80 "	238 "	60 "

APPENDIX B--Continued

Less Challenging to More Challenging Order

Subject	Sitting	Less Challenging	More Challenging
A	75 sec.	70 sec.	69 sec.
(M., T.)	77 "	73 "	72 "
	79 "	74 "	68 "
	84 "	73 "	68 "
	74 "	74 "	70 "
H	60 "	76 "	78 "
(M., T.)	68 "	74 "	86 "
	69 "	76 "	84 "
	71 "	70 "	80 "
	72 "	72 "	80 "
J	50 "	60 "	53 "
(M., T.)	49 "	64 "	48 "
	42 "	54 "	50 "
	45 "	58 "	59 "
	47 "	70 "	65 "
Z	43 "	72 "	74 "
(F., T.)	49 "	62 "	130 "
	54 "	80 "	110 "
	63 "	64 "	123 "
	69 "	56 "	118 "
B	68 "	128 "	268 "
(M., LPO.)	97 "	157 "	312 "
	42 "	190 "	424 "
	61 "	268 "	376 "
	70 "	232 "	400 "
D	70 "	70 "	94 "
(M., LPO.)	76 "	67 "	90 "
	72 "	76 "	80 "
	75 "	71 "	111 "
	75 "	72 "	88 "
E	80 "	74 "	64 "
(M., LPO.)	73 "	69 "	64 "
	74 "	68 "	69 "
	72 "	71 "	68 "
	70 "	66 "	66 "

APPENDIX B--Continued

Less Challenging to More Challenging Order (Continued)

Subject	Sitting	Less Challenging	More Challenging
N	27 sec.	71 sec.	64 sec.
(M., LPO.)	40 "	76 "	54 "
	39 "	82 "	58 "
	44 "	100 "	77 "
	47 "	90 "	45 "
P	30 "	101 "	71 "
(M., LPO.)	39 "	103 "	62 "
	39 "	128 "	68 "
	38 "	103 "	58 "
	49 "	184 "	70 "
X	69 "	90 "	96 "
(F., LPO.)	64 "	86 "	84 "
	69 "	131 "	64 "
	70 "	102 "	90 "
	68 "	141 "	79 "
Y	44 "	54 "	35 "
(F., LPO.)	50 "	62 "	40 "
	50 "	54 "	30 "
	31 "	49 "	45 "
	66 "	52 "	46 "

APPENDIX C

Time estimates of all subjects under two experimental conditions, social situation*

More Challenging to Less Challenging Order

Less Challenging Condition		More Challenging Condition	
Subject C (M.**,T.***)	Subject D (M., LPO.)	Subject C	Subject D
302 sec.	300 sec.	265 sec.	265 sec.
128 "	126 "	246 "	246 "
245 "	248 "	276 "	276 "
235 "	332 "	233 "	233 "
255 "	259 "	244 "	244 "
Subject E (M., LPO.)	Subject F (M., LPO.)	Subject E	Subject F
66 "	70 "	65 "	65 "
69 "	66 "	66 "	69 "
63 "	65 "	60 "	62 "
63 "	64 "	65 "	67 "
62 "	65 "	63 "	66 "
Subject I (M., LPO.)	Subject J (M., T.)	Subject I	Subject J
91 "	67 "	61 "	52 "
106 "	75 "	75 "	61 "
87 "	58 "	50 "	49 "
110 "	92 "	57 "	52 "
101 "	80 "	109 "	65 "

*Estimates are listed in the order in which they were made.

**M. - male; F. - female

***T. - totally blind; LPO. - light-perception-only

APPENDIX C--Continued

More Challenging to Less Challenging Order (Continued)

Less Challenging Condition		More Challenging Condition	
Subject U (F., LPO.)	Subject V (F., T.)	Subject U	Subject V
81 sec.	82 sec.	72 sec.	71 sec.
136 "	136 "	106 "	106 "
194 "	197 "	132 "	132 "
162 "	162 "	142 "	142 "
186 "	186 "	150 "	150 "

Less Challenging to More Challenging Order

Subject A (M., T.)	Subject B (M., LPO.)	Subject A	Subject B
70 "	70 "	80 "	82 "
72 "	73 "	57 "	59 "
70 "	71 "	91 "	93 "
71 "	73 "	77 "	92 "
74 "	74 "	108 "	200 "

Subject G (M., T.)	Subject H (M., T.)	Subject G	Subject H
82 "	76 "	89 "	73 "
84 "	78 "	78 "	79 "
91 "	85 "	92 "	77 "
104 "	95 "	95 "	77 "
83 "	84 "	101 "	89 "

Subject K (M., LPO.)	Subject L (M., T.)	Subject K	Subject L
90 "	91 "	99 "	95 "
77 "	78 "	80 "	117 "
105 "	107 "	95 "	147 "
92 "	92 "	125 "	127 "
94 "	95 "	122 "	122 "

APPENDIX C--Continued

Less Challenging to More Challenging Order (Continued)

Less Challenging Condition		More Challenging Condition	
Subject M (M., LPO.)	Subject N (M., LPO.)	Subject M	Subject N
62 sec.	63 sec.	62 sec.	62 sec.
72 "	72 "	62 "	62 "
60 "	62 "	66 "	76 "
50 "	50 "	57 "	57 "
49 "	50 "	52 "	52 "
Subject W (F., LPO.)	Subject X (F., LPO.)	Subject W	Subject X
80 "	80 "	72 "	72 "
141 "	141 "	118 "	118 "
139 "	139 "	146 "	146 "
148 "	148 "	136 "	136 "
143 "	143 "	151 "	151 "